

**Public Health Issues Associated with
Small Drinking Water Systems
Not Regulated by the Safe Drinking Water Act**

From:

**Nonfederally Regulated Drinking Water Systems:
State and Local Public Health Issues Workshops**

Sponsored by:

**National Center for Environmental Health
Centers for Disease Control and Prevention**

Part 1: September 11 & 12, 2001

Part 2: November 14 & 15, 2001

Atlanta, Georgia

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Executive Summary

Up to half of the citizens of some U.S. states drink water from small systems not regulated by the Safe Drinking Water Act (SDWA). The quality of the drinking water from these systems is generally unknown. Anecdotal information, periodic outbreaks of water-borne diseases, and recent well surveys suggest that public health concerns exist about these systems. A striking example occurred during the winter of 2001. Several groups of vacationers in Wyoming developed diarrhea. Through the combined efforts of epidemiologists, environmental health specialists, and laboratory personnel from the Centers for Disease Control and Prevention (CDC), the State of Wyoming, and the US Environmental Protection Agency (EPA), the outbreak was traced to the water supply of a snowmobile lodge in the Bighorn Mountains. The lodge had a private drinking water system that was too small to be regulated under the SDWA. This outbreak was unusual, not because it occurred, but because it was reported and fully investigated.

To identify specific environmental public health concerns associated with these small (i.e., not federally regulated) drinking water systems and to define the role of the Centers for Disease Control and Prevention (CDC) in addressing them, the National Center for Environmental Health (NCEH) convened two workshops with state and local public health practitioners. Workshop participants identified three broad areas of common concern: inadequate resources, complacent consumers, and lack of technical assistance. Workshop participants specifically requested that CDC:

- Propose expanding the non-regulatory provisions of the SDWA to include small systems.
- Increase public awareness of the importance of safe drinking water.
- Provide technical assistance to state and local environmental health agencies to enhance laboratory capacity, environmental health services, and epidemiologic expertise.

NCEH proposed a number of specific projects to accomplish these activities. If resources for these projects become available, NCEH will follow-up with state and local health agencies to begin to develop these projects.

Introduction

During the winter of 2001, several groups of vacationers in Wyoming developed diarrhea. Through the combined efforts of epidemiologists, environmental health specialists, and laboratory personnel from Centers for Disease Control and Prevention (CDC), the State of Wyoming, and the U.S. Environmental Protection Agency (EPA), the outbreak was traced to the water supply of a snowmobile lodge in the Bighorn Mountains. The lodge had a private drinking water system that was too small to be regulated under the Safe Drinking Water Act (SDWA). This outbreak was unusual, not because it occurred, but because it was reported and fully investigated.

In some states, up to half of the citizens drink water from small systems not regulated by the Safe Drinking Water Act (SDWA). Forty-two million of these people obtain their drinking water from private wells (U.S. Geological Survey, 1995; <http://water.usgs.gov/watuse/pdf1995/html/>). The quality of the drinking water from these systems is generally unknown. Despite anecdotal information, periodic outbreaks of water-borne diseases, and recent well surveys, little is known about the public health risks associated with consumption of this water. State and local environmental public health agencies do not have the resources to conduct the permitting, testing, maintenance, and monitoring needed to ensure that these systems provide healthy water.

To identify specific environmental public health concerns associated with these small (i.e., not federally regulated) drinking water systems and to help define CDC's role in addressing them, CDC's National Center for Environmental Health (NCEH) convened two workshops during the fall of 2001. We invited environmental public health professionals from states we believed would be representative of all states to tell us about the challenges small systems present and what assistance state agencies would like from CDC. Specifically, we invited one person responsible for addressing state-level issues, one person responsible for local implementation of state regulations (if they exist), and one person responsible for public health issues. Representatives from 16 states agreed to participate in the workshops. To provide some structure to the presentations, we provided each person with questions to address at the workshops (Appendix 1). The agendas for the two meetings are in Appendix 2.

We also invited representatives from our federal partners and other relevant organizations to the workshop to serve as resources for our state-based participants: EPA, the U.S. Geological Survey, the American Waterworks Association, the National Association of Drinking Water Administrators, and the National Groundwater Association. The complete list of participants can be found in Appendix 3.

This report summarizes the public health issues that state representatives identified during the workshops.

Presentations by State Representatives

On September 11 and 12, 2001, we met with representatives from Florida, Georgia, Iowa, Kentucky, Louisiana, Maine, North Carolina, Ohio, and Texas (primarily eastern states). On November 14 and 15, we met with representatives from Arizona, California, Colorado, Kansas, Washington State, Wisconsin, and Wyoming (primarily western states). We requested that each state representative present a short discussion outlining his or her primary concerns regarding small drinking water systems that are not regulated by the SDWA.

The primary issues of concern for nearly all states included drinking water contamination with nitrate, arsenic, radioactive elements, and bacteria; well construction, maintenance, and monitoring; and inadequate resources to address these issues. The same general themes were discussed at both workshops. State representatives requested an increased federal role in technical assistance and guidance in addressing the issues associated with these small drinking water systems. They also indicated that the responses to their requests should not be in the form of new federal regulations. The following sections present the priority public health challenges and specific requests for assistance from CDC.

Priority Environmental Public Health Challenges for Small Drinking Water Systems

Presentations made by the state representatives and subsequent discussions identified 10 challenges facing state and local health agencies.

- **Complacency about drinking water quality.** The U.S. has the safest drinking water in the world. However, for people using water from small systems, assumptions about the safety of their water may be inappropriately optimistic. Little, if any, government oversight exists for these systems, leaving largely untrained individuals (often home owners with private wells) responsible for system maintenance and monitoring.
- **Fragmented and inconsistent responsibility for small-systems development, standards, and regulation.** Regulatory oversight of these systems, if it exists, may be divided among several state and local agencies.
- **Insufficient state and local resources to conduct effective water system permitting and monitoring or water quality enforcement.** Many states do not have sufficient resources to do more than is required by the SDWA for the regulated systems, and the unregulated systems often receive little attention.
- **Insufficient locally available laboratory and environmental health services and epidemiologic expertise.** Most states employ few individuals whose primary responsibility is to address drinking water system approval, inspection, and monitoring or to conduct epidemiologic investigations of possible water-related disease outbreaks.
- **Insufficient surveillance of waterborne illness associated with these systems.** Surveillance for water-related diseases is typically passive, and well-defined mechanism for physicians or individuals to report suspected water-related disease outbreaks frequently do not exist. Unless a problem is suspected, data on water quality for a given small system may not be collected beyond the original tests for bacterial contamination, making human health and water quality impossible to link.
- **Inadequate resources to address rapid unmonitored growth.** Drilling several wells, each serving only a few homes, is often more cost-efficient than linking with an existing public water supply. These small systems are exempt from SDWA regulations, and the quality of the water typically is not evaluated. Housing development in formerly agricultural areas generates concerns about the presence of agricultural chemicals and nitrate in drinking water sources.
- **Limited access to and availability of technical assistance.** The states need to understand how to navigate through CDC to quickly identify people with relevant expertise. The states need technical assistance from CDC to: provide or access laboratory capacity; create small systems development, approval, testing, maintenance, and monitoring guidelines; develop water-quality indicators and water-quality guidelines; conduct epidemiologic studies and surveillance for water-related diseases; and identify sources of funding for capacity-building.

- **Insufficient resources to address waterborne biological and/or chemical terrorism.**
The states need to understand whether small systems are likely to be threatened by terrorist activities and whether these activities, if they occur, could be promptly detected.
- **Insufficient resources to respond to un-funded mandates.** Any follow-up actions to these workshops should be presented in the form of training, guidance, technical assistance, and capacity building provided to the state and local environmental health agencies.
- **Insufficient resources to address unscrupulous drinking water system vendors.**
Small system owners and operators need education and guidance to prevent them from using scarce resources to purchase ineffective drinking-water-treatment systems, such as inadequate filters or useless chemicals.

Specific Requests for CDC Assistance

Workshop participants identified three broad areas of common concern regarding the public health impact of small drinking-water systems: 1) State and local resources are inadequate to address small systems issues, 2) Members of the general public served by these small systems are often over-confident of or complacent about their drinking-water quality, and 3) The states need technical assistance and guidance in developing and maintaining these systems. Participants suggested that CDC:

- **Propose expanding the non-regulatory provisions of the SDWA to include small systems.**
 - Generate the appropriate environmental public health data needed to justify non-regulatory federal support under SDWA for small water systems.
 - Create regional CDC offices to support state and local environmental health practitioners with laboratory, epidemiologic, and environmental health services.
 - Provide an environmental public health perspective for land-use planning and emergency planning through the SDWA.
- **Increase public awareness of the importance of safe drinking water.**
 - Translate technical information about the potential adverse human health effects from drinking water contaminants into language that consumers can understand.
 - Create public health information campaign about drinking water.
 - Work with public health partners to promote healthy-water awareness among policy makers.
- **Provide technical assistance to state and local environmental health agencies.**
 - Develop projects to define the public health impact of water-related disease associated with small drinking water systems not regulated by SDWA.
 - Develop and implement a CDC-wide system to refer drinking water inquiries to appropriate resources, including the CDC website.
 - Participate in developing standards and guidelines for construction, maintenance, and monitoring of small systems.
 - Provide financial and technical resources to build state and local capacity in laboratory and environmental health services and in epidemiology.

Workshop Follow-up

On the basis of information provided by workshop participants from state and local environmental public health departments, we identified several possible follow-up projects. NCEH may pursue some of these projects when resources become available; others may be more appropriately pursued by other federal agencies. The specific projects are listed in Appendix 4. The drinking water issues identified by workshop participants will also be incorporated into the CDC strategic plan, Healthy Water: CDC's Public Health Action Plan.

Appendix 1: Questions for Workshop Participants

State-Level Issues

1. Does your state have an inventory of individual domestic water systems (IDWS) and small community water systems (SCWS)?
2. Does your state have a water supply protection program?
3. What are the construction and monitoring requirements for water source development?
4. Who has construction oversight and approval authority to develop these systems?
5. Who has oversight and authority to monitor these systems?
6. Who is responsible for identifying system deficiencies?
7. What proportion of monitored systems is not meeting state-based regulations?
8. What are the barriers to effective implementation of your IDWS and SCWS programs?
9. What are your concerns regarding future development of IDWS and SCWS?
10. What are your concerns regarding maintenance for existing IDWS and SCWS?

Local Level Issues

1. Are trained (and certified, if necessary) people available to develop, manage, and maintain systems?
2. Do you have the expertise and staffing to utilize new water treatment or water analysis methods and instruments?
3. What are the most important problems you face?
4. What proportion of these problems are difficult to overcome because of insufficient funds?
5. What proportion of these problems are difficult to overcome because of engineering deficiencies?
6. What are your concerns regarding future development of IDWS and SCWS?
7. What are your concerns regarding maintenance for existing IDWS and SCWS?

Public Health Issues

1. What are the specific health concerns of users and managers of these systems?
2. What are the problems that present the highest level of human health risk?
3. What proportion of systems that are monitored meet standards to protect human health?
4. Do you conduct surveillance of water-related complaints?
5. Do you conduct surveillance of waterborne outbreaks?
6. How do you handle public inquiries?
7. What happens when someone calls and asks “Is my water safe to drink?”

Appendix 2: Workshop Agendas

September 11 and 12, 2001

Tuesday, September 11, 2001

8:30-8:45	Welcome and charge	Michael McGeehin
8:54-9:00	Welcome	Patrick Meehan
8:45-9:00	Workshop organization	Sarah Allred

Nonfederally regulated drinking water systems: state-level issues

9:00-9:45	Florida	Bart Bibler
	Georgia	Michael Smith
	Iowa	Brent Parker
	Kentucky	Ralph Schiefferle

9:45-10:00 Break

10:00-11:00	Louisiana	Karen Irion
	Maine	David Braley
	North Carolina	Bart Campbell
	Ohio	Rebecca Petty
	Texas	Larry Mitchell

11:00-12:30 Discussion

12:30-1:45 Lunch

Nonfederally regulated drinking water systems: local-level issues

1:45-2:45	Florida	Bob Vincent
	Georgia	Susan Reyher
	Iowa	Hillary Maurer

2:45-3:00 Break

3:00-4:00	Louisiana	Michael Vidrine
	Maine	Paula Thomson
	North Carolina	James "Doc" Thompson
	Ohio	Mark Case
	Texas	Marilyn Christian

4:00-5:30 Discussion

5:30-5:45 Wrap-up

5:45 Adjournment

Wednesday, September 12, 2001

8:30 Workshop organization Sarah Allred

Nonfederally regulated drinking water systems: public health issues

8:45-9:45 Florida Jack Pittman
Georgia John Stackman
Iowa Michael Wichman

9:45-10:00 Break

10:00-11:00 Louisiana Bobbie Savoie
Maine Chris Paulu
North Carolina William Pate
Ohio Bob Frey
Texas Steve Wiley

11:00-12:30 Discussion

12:30-1:00 Workshop wrap-up

1:00 Adjournment

November 14 and 15, 2001

Wednesday, November 14, 2001

8:30- 8:45 Introductory remarks Patrick Meehan

8:55-9:00 Workshop organization Sarah Allred

Nonfederally regulated drinking water systems: state-level issues

9:00-9:45 Arizona John Calkins
 California Gary Yamamoto
 Colorado Jeff Lawrence
 Kansas Debra Baker

9:45-10:00 Break

10:00-10:45 Washington Scott Torpie
 Wyoming Dennis Lamb

10:45-12:30 Discussion

12:30-1:45 Lunch

Nonfederally regulated drinking water systems: local-level issues

1:45-2:45 Arizona Will Humble
 California Wayne Fox
 Colorado Jim Rada
 Kansas Dan Partridge

2:45-3:00 Break

3:00-3:45 Washington Keith Higman
 Wisconsin Jeff Phillips
 Wyoming Michael Dart

3:45-5:15 Discussion

5:15-5:30 Wrap-up

5:30 Adjournment

Thursday, November 15, 2001

8:30 Workshop organization Sarah Allred

Nonfederally regulated drinking water systems: public health issues

8:4 -9:45 Arizona Will Humble
Colorado Lucinda Hammond
Kansas Gail Hansen
Washington Jim Vanderslice

9:45-10:00 Break

10:00-10:45 Wisconsin Tom Seiger
Wyoming Carl Musgrove

10:45-12:15 Discussion

12:15-12:30 Workshop wrap-up

12:30 Adjournment

Appendix 3: Workshop Participants

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Appendix 4: Specific Projects to Support the Suggested CDC Activities

Projects that could be developed with assistance from NCEH:

- Develop or implement a surveillance system to identify and assess the public health impact from drinking water from small systems not regulated by the SDWA.
- Conduct epidemiologic studies of the human health impact of chemical contamination of drinking water.
- Translate potential human health effects from drinking water contaminants into plain language that consumers can understand.
- Ensure that public health is a component of all relevant regulatory actions.
- Develop and implement a CDC-wide system for routing incoming inquiries about water quality to staff who have the appropriate expertise.
- Develop an information campaign to raise public awareness of the importance of healthy drinking water by updating and enhancing currently available information at CDC's website (URL = <http://www.cdc.gov>) and by providing links to other resources, such as the National Drinking Water Clearinghouse and National Small Flows Clearinghouse.
- Develop grants programs to support infrastructure growth and improvement for the small water systems not covered by the SDWA.
- Develop a program to train operators of small drinking water systems.
- Develop a trouble-shooting manual for small system operators.
- Develop a program for controlled growth that includes appropriate local government evaluation of drinking water resources before development is approved.
- Develop a program to assess the drinking water needs of rural populations.
- Work with the U.S. Department of Housing and Urban Development and other mortgage lenders to encourage water quality testing at time of home sale or new development.
- Provide funding to develop regional water-quality expertise accessible by state and local health and environment agencies (perhaps as CDC regional offices).
- Expand CDC's current activities to estimate the contribution of drinking water to baseline gastrointestinal illness to include small systems.
- Provide assistance to develop emergency response plans for small water systems.
- Develop a risk-focused sanitary survey that covers the most important risk factors for small systems.

Projects that could be supported with assistance from agencies other than CDC:

- Develop water-quality guidelines for small systems.
- Develop water-quality indicators for small systems.
- Develop guidelines for all aspects of well construction, use, and abandonment.
- Develop a program to support both routine and emergency water monitoring and testing.
- Develop a prototype database to inventory small systems.
- Develop a prototype well-monitoring survey instrument using Geographical Information Systems (GIS).

- Continue regional well surveys, including assessment of background levels of microorganisms and chemicals.
- Use GIS techniques to identify small systems at risk from known geologic or geographic distributions of drinking water contaminants.